

REMARKS

Claims 1, 3-6, 9-14, 30-31, 34-41, and 44-49 remain pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

CLAIM OBJECTIONS

Claims 5, 6 and 30-49 stand objected to for various informalities. Claims 5, 6, 30, 31, 40, and 41 are amended according to the examiner's suggestions. Claims 32-49 and 42-49 variously depend from claims 30, 31, 40 or 41.

REJECTION UNDER 35 U.S.C. § 102

Claim 4 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Hikari (JPN 09-017795). This rejection is respectfully traversed.

Claim 4 calls for a method of forming a bump comprising: (a) preparing a pad covered with an insulating layer; (b) forming a resist layer on the insulating layer to have through-holes located over the pad; (c) forming an opening in the insulating layer within the through hole to expose at least a part of the pad after the step (b); and (d) forming metal posts in the through-holes and on the pad conforming to a shape of the through-holes so as to have a space between the metal posts while the resist layer exists.

According to the claimed configuration, one resist layer is used for two steps: 1) forming an opening in the insulating layer; and 2) forming a metal post. This advantageously enables a reduction in the number of required processes. Hikari fails to

teach or suggest such a configuration. Accordingly, claim 4 should be in condition for allowance.

REJECTION UNDER 35 U.S.C. § 103

Claims 1, 5, 7 and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Saitoh, et al. (EPN 766310A2) in view of Yoshiaki, et al. (JPN 01-191451). This rejection is respectfully traversed.

Claim 1 calls for a method of forming a bump comprising: (a) preparing a pad covered with an insulating layer; (b) forming a resist layer on the insulating layer to have a through-hole located over the pad, the resist layer having an inner surface to define the through-hole, the inner surface having a portion projecting inwardly in the through-hole; (c) forming an opening in the insulating layer within the through-hole to expose at least a part of the pad after the step(b); and (d) forming a metal post on the pad conforming to a shape of the through-hole so as to have a side surface having a recess formed therein while the resist layer exists.

As stated above, the claimed configuration enables one resist layer to perform two steps: 1) form an opening in the insulating layer; and 2) form a metal post. This reduces in the number of required processes. Neither Saitoh nor Yoshiaki teaches or suggests such a configuration. Rather, Saitoh in Figs. 4-5 (and in corresponding US Pat. No. 6229220, col. 4, lines 24-33) discloses an insulating layer with an opening formed therein before the step of forming a resist layer for forming a metal post. This implies that another resist layer was formed to from the opening in the insulating layer before the step of forming the resist layer for the metal post.

Claim 5 depends from claim 1 and should be allowable for at least the same reasons as set forth above. Claims 7 and 15 are cancelled. Accordingly, claims 1 and 5 should be in condition for allowance.

Claims 3, 6, 8, 17, 30-33, 41 and 43 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Natsuya (JPN 07-066207), or Hikari or Saitoh in view of Yoshiaki, as applied above, (and further) in view of Dion (USPN 5130275). This rejection is respectfully traversed.

Claim 3 calls for a method of forming a bump comprising: (a) preparing a pad covered with an insulating layer; (b) forming a resist layer on the insulating layer to have a through-hole located over the pad, the through-hole having a ring shape so that part of the resist layer remains at a center of the through-hole; and (c) forming an opening in the insulating layer within the through-hole to expose at least a part of the pad after the step (b); and (d) forming a metal post on the pad conforming to a shape of the through-hole so that the metal post is not higher than the resist layer and the metal post has a hole exposing the pad while the resist layer exists.

The claimed configuration enables one resist layer to perform two steps: 1) form an opening in the insulating layer; and 2) form a metal post. This reduces in the number of required processes. The cited references fail to teach or suggest such a configuration. As stated above, Saitoh in Figs. 4-5 (and in corresponding US Pat. No. 6229220, col. 4, lines 24-33) discloses an insulating layer with an opening formed therein before the step of forming a resist layer for forming a metal post thereby implying that another resist layer was formed to form the opening in the insulating layer

before the step of forming the resist layer for the metal post. Dion teaches the same deficiency in Figs. 2-6.

Claim 6 depends from claim 1 and should be allowable for at least the same reasons as set forth above. Claims 30 and 31 depend from claim 3 and should be allowable for at least the same reasons as set forth above. Claim 41 depends from claim 4 and should be allowable for at least the same reasons as set forth above. Claims 8, 17, 32, 33 and 43 are cancelled. Accordingly, claims 3, 6, 30, 31, and 41 should be in condition for allowance.

Claims 9-14, 34-40, 42 and 44-49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Hikari or the combination of Saitoh or Natsuya with their respective applied references, as applied above, and further in view of Watanabe, et al. (USPN 6218281). This rejection is respectfully traversed.

Claims 9, 11 and 13 depend from claim 5 which depends from claim 1 and should be allowable for at least the same reasons as set forth above. Claims 10, 12 and 14 depend from claim 6 which depends from claim 1 and should be allowable for at least the same reasons as set forth above. Claims 34, 36 and 38 depend from claim 30 which depends from claim 3 and should be allowable for at least the same reasons as set forth above. Claims 35, 37 and 39 depend from claim 31 which depends from claim 3 and should be allowable for at least the same reasons as set forth above. Claim 40 depends from claim 4 and should be allowable for at least the same reasons as set forth above. Claims 44, 46 and 48 depend from claim 40 which depends from claim 4 and should be allowable for at least the same reasons as set forth above. Claims 45, 47

and 49 depend from claim 41 which depends from claim 4 and should be allowable for at least the same reasons as set forth above.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: _____

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By: _____

G. Gregory Schirley
Reg. No. 27,382
Bryant E. Wade
Reg. No. 40,344

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

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